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**IS 7482 : 1989**
**(Reaffirmed 2005)**

*Indian Standard*

# PROTEIN-BASED BEVERAGES — SPECIFICATION

*( First Revision )*

# भारतीय मानक

## प्रोटीन आधारित पेय — विशिष्टि

(पहला पुनरीक्षण)

UDC 637·181 : 664·38

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**BUREAU OF INDIAN STANDARDS**
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

*October* 1989 **Price Group 2**

Nutrition Sectional Committee, AFDC 37

## FOREWORD

This Indian Standard ( First Revision ) was adopted by the Bureau of Indian Standards on 25 January 1989, after the draft finalized by the Nutrition Sectional Committee had been approved by the Agricultural and Food Products Division Council.

In India and in other South-East Asian countries, milk is not available in adequate quantity to meet the needs of infants and of the growing population. Efforts have, therefore, been made to utilize vegetable proteins in the preparation of milk-like beverages. Following successful research at the Central Food Technological Research Institute, Mysore, such beverages are being produced on a commercial scale by some dairies as extenders for milk supplies. Flavoured beverages of a similar type are also being commercially produced and marketed by public sector dairies and private industry. This standard incorporates the technical experience gained from research and production of these types of protein-based beverages. Provisions for various micro-nutrients which would ensure optimization of nutritive value of these beverages have also been included.

The process for the production of protein-based beverages either as milk extenders or for use as such, essentially consists in : (a) extraction of protein from vegetable sources, (b) repeptization in water at a suitable *p*H along with salts, vitamins and liquid glucose or sucrose; (c) homogenization and blending with milk, if required; and (d) pasteurization and bottling. Protein-based beverages could also be made by emulsifying oilseeds, such as soya and groundnut in water, and adding necessary minerals, vitamins, amino acids, and liquid glucose or sucrose. This could then be homogenized and blended with milk, pasteurized and bottled.

*Flavoured Protein Beverages* — The protein-based beverage, obtained as above, may also contain permitted edible flavours, colours and extra sugar or sweetening agents.

*Sterilization* — The protein-based beverage or the flavoured protein beverage should be filled into bottles, sealed with a crown cork or otherwise, and sterilized at a suitable temperature for a suitable time to extend the shelf life.

This standard was first published in 1974. It has been revised to update it in view of the latest technological developments. The basic change in the standard is that the values in Table 2 have been changed, namely vitamins A and D have been prescribed at a level so that 200 g of the product contains one-third the RDI's; the levels of thiamine, riboflavin and nicotinic acid have been prescribed per 1 000 calories instead of per 100 grams; the limit of ascorbic acid has been deleted, and instead of calcium, the calcium : phosphorus ratio has been prescribed.

While formulating this standard, necessary consideration has been given to the relevant Rules prescribed by the Government of India under the *Prevention of Food Adulteration Act, 1954* and *Standards of Weights and Measures* (*Packaged Commodities*) *Rules, 1977*. This standard is, however, subject to the restrictions imposed under these, wherever applicable.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

# Indian Standard

# PROTEIN-BASED BEVERAGES — SPECIFICATION

## ( *First Revision* )

## 1 SCOPE

This standard prescribes the requirements and the methods of sampling and test for protein-based nutritive beverages obtained from protein isolates or other oilseed protein sources and then optionally mixed with milk or milk powder or suitable amino acids, flavoured and sweetened if so desired, and then pasteurized or sterilized.

## 2 REFERENCES

The Indian Standards listed in Annex A are necessary adjuncts to this standard.

## 3 TERMINOLOGY

For the purpose of this standard, the following definitions shall apply.

### 3.1 Acceptance Tests

Tests ( *see* **6 2** ) carried out on samples selected from the lot for the purpose of acceptance of the lot.

### 3.2 Type Tests

All the tests ( *see* **6.3** ) to approve the formulation and quality of the product at least at the beginning of marketing/certification. These tests may also be conducted periodically to supplement the routine tests or whenever the basic formula is changed.

## 4 TYPES

**4.1** The protein-based nutritive beverages shall be of the following types:

a) Pasteurized,
b) Flavoured and pasteurized,
c) Sterilized, and
d) Flavoured and sterilized.

**4.2** Any flavoured protein-based nutritive beverage shall also be identified according to the flavour added, such as, vanilla, chocolate, coffee and fruit flavour.

## 5 INGREDIENTS

**5.1** The protein-based nutritive beverage shall be prepared from high grade protein sources, such as, from edible oilseeds or their flour, or concentrates or isolates, conforming to the relevant Indian Standard Specifications. The beverage may be blended either with milk, milk powder, skim milk powder or with amino acids.

**5.2** The fats, flavours, colours, emulsifiers, stabilizers and sweeteners added shall be those permitted under the PFA Rules and shall be of good quality.

## 6 REQUIREMENTS

### 6.1 General

For pasteurized protein-based nutritive beverages, guidelines given in IS 6397 : 1971 shall be followed. The flavoured beverages shall conform to the requirements prescribed in IS 4709 : 1968. Sterilized protein-based beverages shall conform to the requirements given in IS 4238 : 1967.

### 6.2 Acceptance Tests

**6.2.1** *Description*

The protein-based nutritive beverage shall be in the form of a stable emulsion. It shall also be free from extraneous matter, harmful material and pathogenic organisms.

**6.2.2** *Organoleptic Qualities*

The flavour of the protein-based nutritive beverage shall be fresh and pleasant. It shall not have a rancid taste or musty odour.

**6.2.3** *Condition of Manufacture*

The protein-based nutritive beverages shall be manufactured, packed, stored and distributed under hygienic conditions in licensed premises ( *see* IS 2491 : 1972 ).

**6.2.4** The product shall also conform to the requirements given in Table 1.

### 6.3 Type Tests

**6.3.1** *Protein Quality*

Protein efficiency ratio ( PER ) of the protein in the beverage shall be not less than 2·0 ( corrected PER ) when determined according to the method given in IS 7481 : 1974.

**6.3.2** *Aflatoxin*

The protein-based beverage shall not have an aflatoxin content more than 30 mcg/kg of food when tested according to the method given in Appendix K of IS 7837 : 1975.

**6.3.3** *Urease Activity*

The protein based nutritive beverage shall not show a change *p*H by more than 1·0 when determined by the method given in Appendix D of IS 7837 : 1975.

**Table 1 Requirements for Protein-Based Beverages**
( *Clauses* 6.2.4 *and* 9.1 )

| Sl No. | Characteristic | Requirement | Method of Test, Ref to |
|---|---|---|---|
| i) | Total solids, percent by mass, *Min* | 11·5 | Appendix A of IS 4079 : 1967 |
| ii) | Fat, percent by mass, *Min* | 1·5 | Appendix C of IS 1547 : 1985 |
| iii) | Protein (N × 6·25), percent by mass, *Min* | 3·0 | IS 7219 : 1973 |
| iv) | Lactose (monohydrate), percent by mass, *Min* | 2·2 | Cl 13 of IS 1479 (Part 2) : 1961 |
| v) | Turbidity test | To conform to test | Annex B |
| vi) | Total bacterial count/g, *Max* | 50 000 | IS 5402 : 1969 |
| vii) | Coliform count/g, *Max* | 10 | IS 5401 : 1969 |
| viii) | *Salmonella* | Absent ( in 1 g ) | IS 5887 ( Part 3 ) : 1976 |
| ix) | *Shigella* | Absent ( in 1 g ) | |
| x) | *E Coli* | Absent ( in 1 g ) | IS 5887 ( Part 1 ) : 1976 |

**6.3.4** *Gossypol*

The protein-based nutritive beverage shall not have free gossypol content more than 0·006 percent by mass and total gossypol content not more than 0·12 percent by mass, when tested according to the method prescribed in Appendices B and C of IS 4876 : 1986.

NOTE — Aflatoxin content, gossypol content and urease activity shall be determined only if protein derived from groundnut, cottonseed and/or soya, respectively, have been used in formulating the protein-based beverages.

**6.3.5** The product shall also conform to the requirements given in Table 2.

## 7 PACKING AND MARKING

### 7.1 Packing

**7.1.1** Pasteurized protein-based nutritive beverages shall be marketed in glass bottles or any other suitable containers and capped either by aluminium foil or polyethylene. The beverage may also be supplied to bulk consumers in accordance with the agreements arrived at between the consumer and the producer but without affecting the product quality in any way.

**7.1.2** Sterilized protein-based nutritive beverages shall be filled in glass bottles or sanitary cans and properly sterilized. The containers shall be capped or sealed air-tight before sterilization.

### 7.2 Marking

The following particulars shall be marked or labelled on each container:

a) Calories and protein per 100 g;
b) Name of the material and trade name or brand name, if any;
c) Name and address of the manufacturer;
d) Net volume and mass;

**Table 2 Requirements of Vitamins and Minerals for Protein-Based Beverage**
( *Clause* 6.3.5 )

| Sl. No. | Characteristic | Requirement | Method of Test, Ref to |
|---|---|---|---|
| i) | Vitamin A, mcg/100 g, *Min* | 172 | IS 5886 : 1970 |
| ii) | Vitamin D, mcg/100 g, *Min* | 1·7 | IS 5835 : 1970 |
| iii) | Vitamin $B_{12}$, mcg/100 g, *Min* | 0·2 | (*See* Note) |
| iv) | Folic acid, mcg/100 g, *Min* | 5·0 | (*See* Note) |
| v) | Pyridoxine (vitamin $B_6$) mg/100 g, *Min* | 0·2 | (*See* Note) |
| vi) | Thiamine (as hydrochloride), mg/1 000 calories, *Min* | 0·5 | IS 5398 : 1969 |
| vii) | Riboflavin (Vitamin $B_2$), mg/1 000 calories, *Min* | 0·55 | IS 5399 : 1969 |
| viii) | Nicotinic acid (Niacin), mg/1 000 calories, *Min* | 6·6 | IS 5400 : 1969 |
| ix) | Calcium : Phosphorus | 2·1 | Appendix F of IS 1656 : 1985 |
| x) | Iron mg/100 g, *Min* | 1·0 | |

NOTE — For estimating folic acid and vitamin $B_{12}$, the manufacturers should maintain a record showing the quantity of these vitamins added to the products.

e) Names and quantities of emulsifiers and stabilizers added;

f) Quantity of milk per 100 g;

g) List of ingredients;

h) Date of manufacture;

j) Date of expiry; and

k) Any other details required under the *Standards of Weights and Measures ( Packaged Commodities ) Rules, 1977.*

## 8 SAMPLING

The representative samples shall be drawn in accordance with col 1 and 3 of Table 2 of IS 4238 : 1967 and conformity of the material to the requirements of this specification shall be determined according to the procedure described in Appendix F of IS 4238 : 1967.

## 9 TESTS

**9.1** Tests shall be carried out as specified in **6.1**, **6.2**, **6.3** and Table 1.

**9.2 Quality of Reagents**

Unless specified otherwise, pure chemicals shall be employed in tests and distilled water ( *see* IS 1070 : 1977 ) shall be used where the use of water as reagent is intended.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the test results.

# ANNEX A

( *Clause* 2 )

## LIST OF REFERRED INDIAN STANDARDS

| *IS No.* | *Title* |
|---|---|
| IS 1070 : 1977 | Specification for water for general laboratory use ( *second revision* ) |
| IS 1479 ( Part 2 ) : 1961 | Methods of test for dairy industry : Part 2 Chemical analysis of milk |
| IS 1547 : 1985 | Specification for infant milk foods ( *second revision* ) |
| IS 1656 : 1985 | Specification for milk-cereal based weaning food ( *second revision* ) |
| IS 2491 : 1972 | Code for hygienic conditions for food processing units ( *second revision* ) |
| IS 4079 : 1967 | Specification for canned *RASOGOLLA* |
| IS 4238 : 1967 | Specification for sterilized milk |
| IS 4684 : 1975 | Specification for edible groundnut flour ( expeller pressed ) ( *first revision* ) |
| IS 4709 : 1968 | Specification for flavoured milk |
| IS 4876 : 1986 | Specification for edible cotton seed flour ( solvent extracted ) |
| IS 5391 : 1969 | Methods for estimation of thiamine ( vitamin $B_1$ ) in foodstuffs |
| IS 5399 : 1969 | Methods for estimation of riboflavin ( vitamin $B_2$ ) in foodstuffs |
| IS 5400 : 1969 | Methods for estimation of nicotinic acid ( niacin ) in foodstuffs |
| IS 5401 : 1969 | Methods for detection and estimation of coliform bacteria in foodstuffs |
| IS 5402 : 1969 | Methods for plate count of bacteria in foodstuffs |
| IS 5835 : 1970 | Methods for estimation of vitamin D in foodstuffs |
| IS 5886 : 1970 | Methods for estimation of carotenes and vitamin A ( Retinol ) in foodstuffs |
| IS 5887 ( Part 1 ) : 1976 | Methods for detection of bacteria responsible for food poisoning : Part 1 Isolation, identification and enumeration of *Escherichia coli* ( *first revision* ) |
| 5887 ( Part 3 ) : 1987 | Methods for detection of bacteria responsible for food poisoning: Part 3 Isolation and identification of *Salmonella* and *Shigella* ( *second revision* ) |
| IS 6397 : 1971 | Code for pasteurization of milk |
| IS 7219 : 1973 | Methods for determination of protein in foods and feeds |
| IS 7481 : 1974 | Methods for determination of protein efficiency ratio ( PER ) |
| IS 7837 : 1975 | Specification for edible full-fat soya flour |

# ANNEX B

[ *Table* 1, Sl No. ( v )]

## DETERMINATION OF TURBIDITY

### B-1 APPARATUS

**B-1.1 Water Bath**

**B-1.2** Glass Test Tube, 16 mm×160 mm size, perfectly transparent.

**B-1.3** Erlenmeyer flask, 50 ml capacity.

**B-1.4** Whatman No. 12 or its equivalent filter paper, 12·5 cm diameter.

### B-2 REAGENTS

**B-2.1** Ammonium sulphate.

### B-3 PROCEDURE

Place 4 g of ammonium sulphate and 20·0 ± 0·5 ml of the sample at room temperature in the 50 ml Erlenmeyer flask. Agitate the flask for about one minute until the ammonium sulphate dissolves. Let the solution stand for at least 5 minutes, then filter it through the pleated filter paper. Collect 5 ml of the filtrate in the glass test tube ( **B-1.2** ). Place the tube in a boiling water bath. Examine the tube by moving it before a source of light from which the observers' eyes are screened. The filtrate should be clear.

### B-4 INTERPRETATION

Even a slight turbidity would indicate an insufficient heat treatment given to the sterilized milk.

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**Printed at Swatantra Bharat Press, Delhi, India**

# AMENDMENT NO. 1 SEPTEMBER 1990
# TO
# IS 7482 : 1989 PROTEIN-BASED BEVERAGES — SPECIFICATION

## ( *First Revision* )

( *Page* 1, *clause* **5.1** ) — Add the following at the end:

'Vitamins and minerals may be added to bring the requirements up to the levels stated in Table 2, with necessary overages'.

( *Page* 1, *clause* **6.2.4** ) — Add the following new clause after **6.2.4**:

'**6.2.5** In case milk, milk powder or skim milk powder have been added to the protein-based beverage, the lactose monohydrate shall be not less than 2·2 percent by mass when tested by the method given in **13** of IS 1479 ( Part 2 ) : 1961.

[ *Page* 2, *Table* 1, *Sl No.* ( iv ) ] — Delete, and renumber subsequent clauses accordingly.

( *Page* 2, *clause* **7.1.2** ) — Add the following new clause after **7.1.2**.

'**7.1.3** For UHT processed products, aseptic packing may be done in polylaminate containers.'

[ *Page* 3, *clause* **7.2** ( f ) ] — Substitute the following for the existing:

'f) Quantity of milk per 100 g ( if added );'

( FADC 21 )

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Printed at Printwell Printers, Delhi, India